

What is claimed:

1. An isolated soluble non-fibrillar amyloid β protein assembly comprising 3-12 amyloid β proteins and having neurotoxic activity in organotypic brain slice cultures from adult animals.
2. An isolated amyloid β protein assembly according to claim 1 wherein the assembly is a soluble non-fibrillar globular structure with dimensions approximately 4.9 - 5.3 nm as measured by atomic force microscopy having a molecular weight of 23-24 kD.
3. An isolated amyloid β protein assembly according to claim 1 wherein the assembly is a soluble non-fibrillar globular structure with dimensions approximately 5.7 - 6.2 nm as measured by atomic force microscopy having a molecular weight of 27-28 kD.
4. A method for measuring the vivo effects of the protein assembly of claim 1 comprising:
 - (a) administering the protein assembly of claim to an animal, and
 - (b) conducting the LTP procedure by;
 - (i) administering an electrical stimulus and
 - (ii) measuring the cell body spike amplitude over time.
5. A method for protecting brain cells against toxicity of amyloid β protein comprising blocking the formation or activity of the

protein assembly of claim 1.

6. A method of treating or preventing Alzheimer's disease and related dementias and memory disorders in human beings by blocking the formation or the activity of the protein assembly of claim 1.

- 5 7. A method for detecting the protein assembly of claim 1 comprising:
- (a) contacting the test material with 6E10 antibody; and
 - (b) detecting binding of the antibody.

8. A method for detecting the protein assembly as claim 1 comprising:
- (a) contacting test material with B103 neuroblastoma cells, and
 - (b) measuring morphological changes in said cells.

9. A method for detecting the protein assembly of claim 1 comprising:
- (a) contacting the test material with brain slice cultures, and
 - (b) measuring brain cell death.

10. A method for detecting the protein assembly as claim 1 comprising:
- (a) contacting test material with B103 neuroblastoma cells, and
 - (b) measuring increases in fyn kinase activity.

11. A method for identifying compounds that block receptor binding of the protein assembly of claim 1, comprising:

- (a) mixing test compound with cell culture media after formation of the protein assembly of claim 1.
- (b) contacting the mixture of 10 (a) with B103 cells or other neuronal cells.
- (c) adding a labeled reagent that can bind to the protein assembly of claim 1.

- (d) detecting the presence of the labeled reagent bound to the protein assembly of claim 1.

12. A method for identifying compounds that block formation of the protein assembly of claim 1, comprising:

- (a) mixing test compound with media before in the procedure to form the protein assembly of claim 1, and
- (b) contacting the mixture of 10 (a) with B103 cells or other neuronal cells.
- (c) adding a labeled reagent that can bind to the protein assembly of claim 1.
- (d) detecting the presence of the labeled reagent bound to the protein assembly of claim 1.
- (e) test compounds exhibiting more inhibition of receptor binding of the protein assembly of claim 1 when the test compound is added before the formation of the protein assembly of claim 1 compared with addition of test compounds after formation are compounds that block formation of the protein assembly of claim 1.